OM-236 031B 2009−05

Effective with serial number 249 680

Processes

Stick (SMAW) Welding

TIG (GTAW) Welding

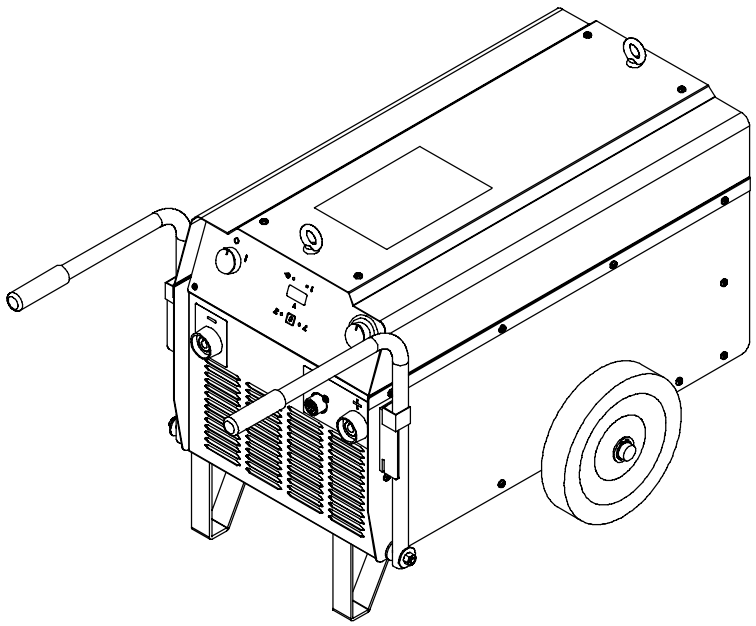
Description

DC CC 3 Phase

Arc Welding Power Source

STR 450

CE



OWNER'S MANUAL

www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets.

TRUE BLUE® WARRANTY

Working as hard as you do − every power source from Miller is backed by the most hassle-free warranty in the business.

Miller®

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WARRANTY

DECLARATION OF CONFORMITY

for European Community (CE marked) products.

ITW Welding Products Italy S.r.l. Via Privata Iseo 6/E, 20098 San Giuliano M.se, (MI) Italy declare that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Council Directive(s) and Standard(s).

Product/Apparatus Identification:

Product	Stock Number
STR 450	029 016 239

Council Directives:

- 2006/95/EC Low Voltage
- 2004/108/EC Electromagnetic Compatibility
- 2006/42/EEC Machinery Directive

Standards:

- IEC 60974-1 Arc Welding Equipment - Welding Power Sources: edition 3, 2005-07.
- IEC 60974-10 Arc Welding Equipment Electromagnetic Compatibility Requirements: edition 2.0, 2007-08

EU Signatory:

Mark Lowther

May 15, 2009

Mark Lowther

European Director, Technology & Product Development.

Date of Declaration

SECTION 1 − SAFETY PRECAUTIONS - READ BEFORE USING

Protect yourself and others from injury — read and follow these precautions.

1-1. Symbol Usage

DANGER! − Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE *− Indicates statements not related to personal injury.*

☞ *Indicates special instructions.*

This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.

Only qualified persons should install, operate, maintain, and repair this unit.

During operation, keep everybody, especially children, away.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground − check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first − double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring − replace cord immediately if damaged − bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists in inverter-type welding power sources after removal of input power.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

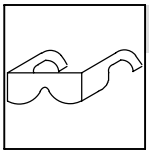
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

MAGNETIC FIELDS can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder − explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

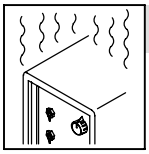
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring − be sure power supply system is properly sized, rated, and protected to handle this unit.

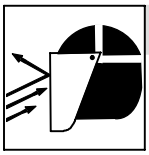
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



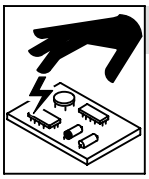
OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



FLYING SPARKS can cause injury.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

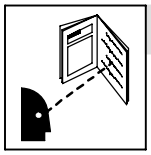
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

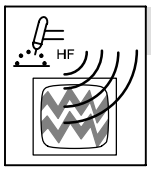
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.



READ INSTRUCTIONS.

- Read Owner's Manual before using or servicing unit.
- Use only genuine replacement parts from the manufacturer.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

For Gasoline Engines:

Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Mississauga, Ontario, Canada L4W 5NS (phone: 800-463-6727 or in Toronto 416-747-4044, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036–8002 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, Quincy, MA 02269-9101 (phone: 617-770-3000, website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

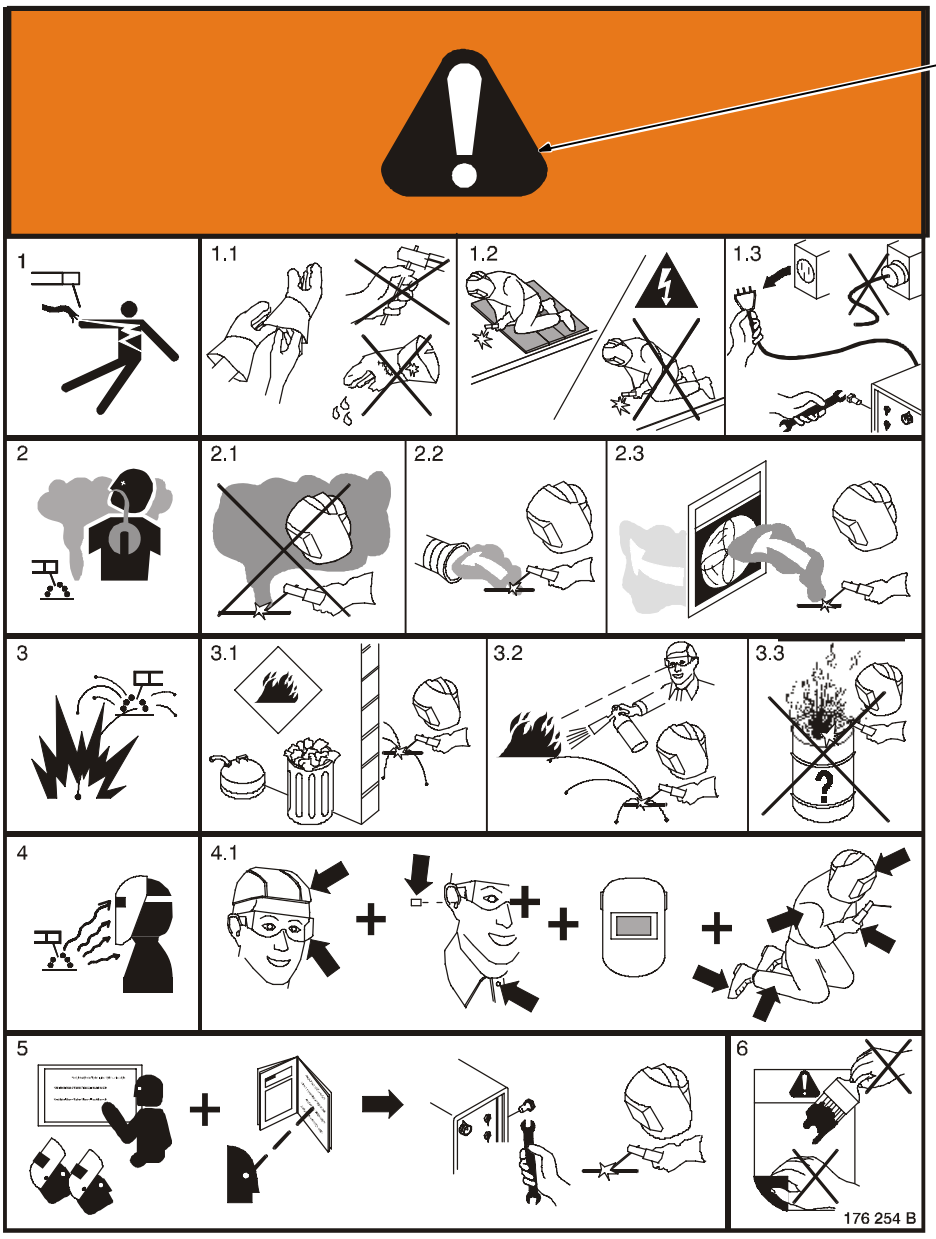
1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 − DEFINITIONS

2-1. Warning Label Definitions (For Wordless Labels)



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

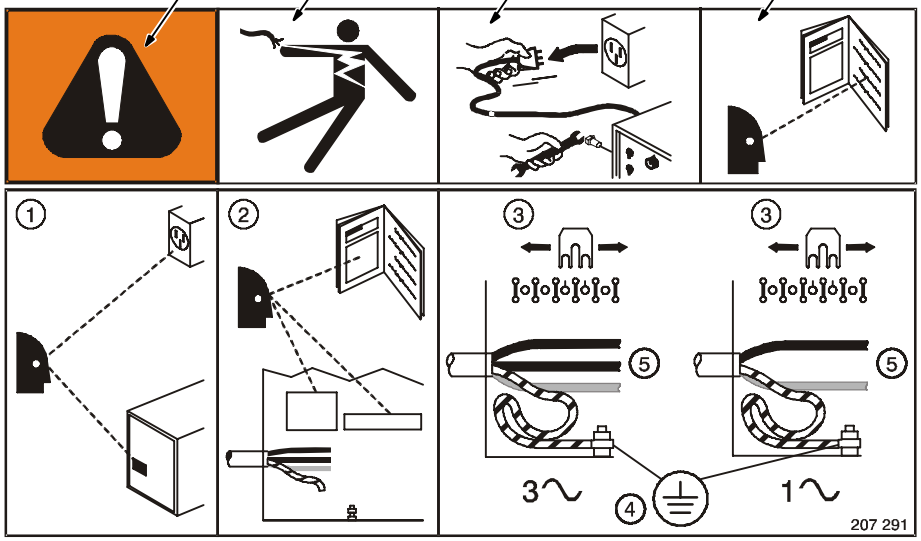
3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.



Warning! Watch Out! There are possible hazards as shown by the symbols.

Electric shock from wiring can kill.

Disconnect input plug or power before working on machine.

Read the Owner's Manual before working on this machine.

1 Consult rating label for input power requirements, and check power available at the job site − they must match.

2 Read Owner's Manual and inside labels for connection points and procedures.

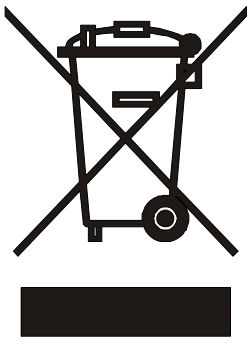
3 Move jumper links as shown on inside label to match voltage at job site.

4 Having a loop of extra length, connect grounding conductor first.

5 Connect line input conductors as shown on inside label − double-check all connections, jumper link positions, and input voltage before applying power.

1/96

2-2. WEEE Label (For Products Sold Within The EU)



Do not discard product (where applicable) with general waste.

Reuse or recycle Waste Electrical and Electronic Equipment (WEEE) by disposing at a designated collection facility.

Contact your local recycling office or your local distributor for further information.

2-3. Symbols And Definitions

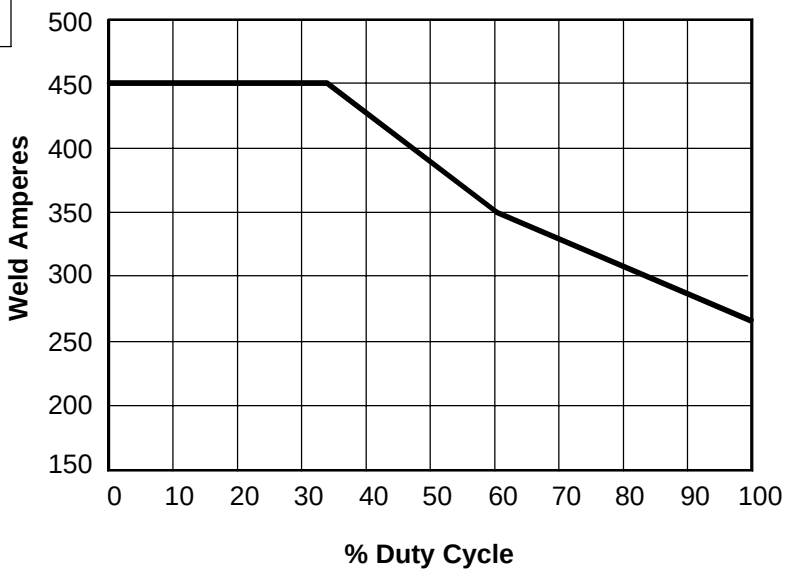
A Amperes	Negative Weld Output Terminal	Positive Weld Output Terminal	Protective Earth (Ground)
Output	Supplementary Protector	Off	On
V Volts	Shielded Metal Arc Welding (SMAW)	Input	Remote
Constant Current (CC)	X Duty Cycle	I_1 Rated Supply Current	I_2 Rated Welding Current
U_0 Rated No-Load Voltage (Average)	U_1 Rated Supply Voltage	U_2 Load voltage	Line Connection
Scratch Start TIG	Adjust	X Duty Cycle	Three Phase Transformer Rectifier
Fuse	IP Internal Protection Rating	S_1 KVA	
Current Increase Scale		Current Increase/ Decrease	

SECTION 3 − INSTALLATION

3-1. Specifications

Model	Rated Welding Output	Ampere Range DC	Max Open-Circuit Voltage DC	IP Rating	Amperes Input at Rated Load Output, 50/60 Hz, Three-Phase		KVA/KW	Weight	Dimensions (mm) L x W x H
					230 V	400 V			
450	450 A @ 38 Volts DC, 35% Duty Cycle	25−450 A	80 V	IP22	72 A	42 A	29/17	170 kg	1100 x 620 x 700

3-2. Duty Cycle and Overheating

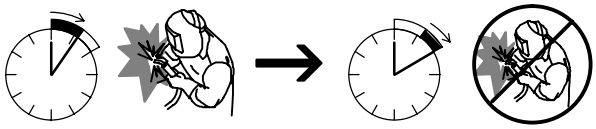


Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

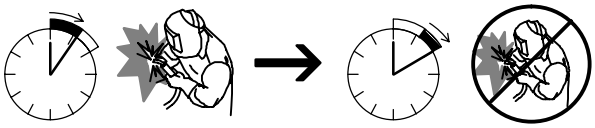
NOTICE − ***E****xceeding duty cycle can damage unit and void warranty.*

35% Duty Cycle At 450 A



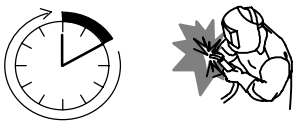
3.5 Minutes Welding — 6.5 Minutes Resting

60%Duty Cycle At 350 A



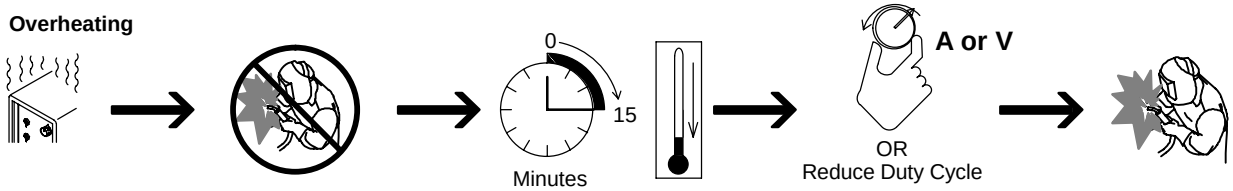
6 Minutes Welding — 4 Minutes Resting

100% Duty Cycle At 450 A



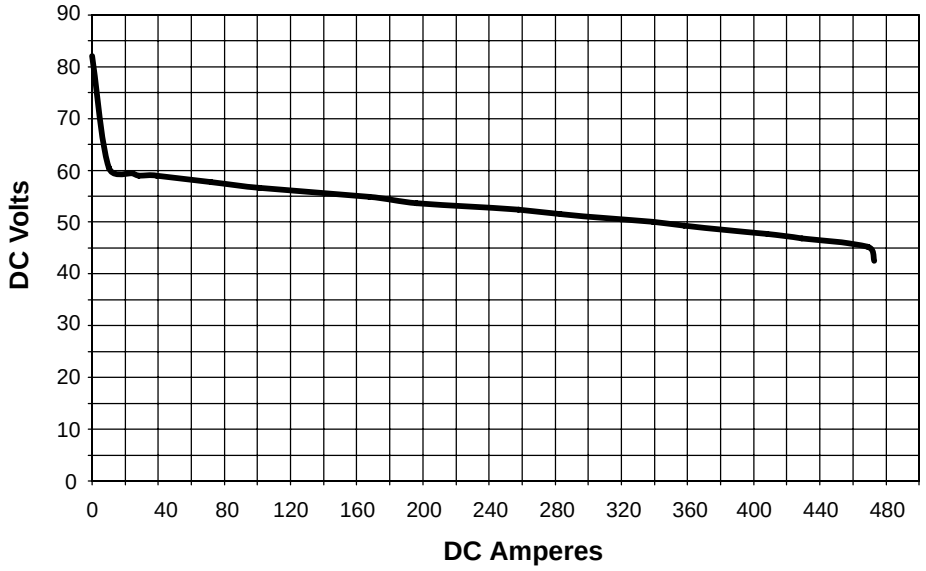
Continuous Welding

Overheating

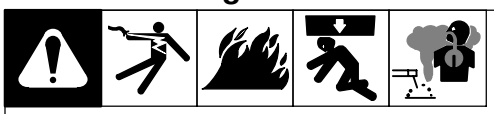


3-3. Volt-Ampere Curves

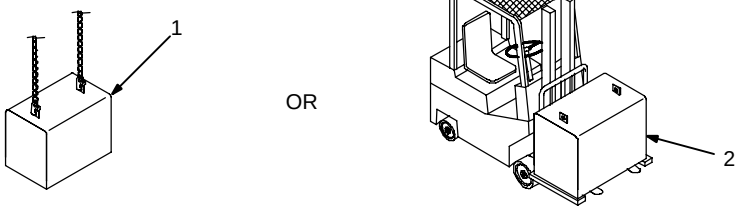
The volt-ampere curves show the normal minimum and maximum voltage and amperage output capabilities of the unit.



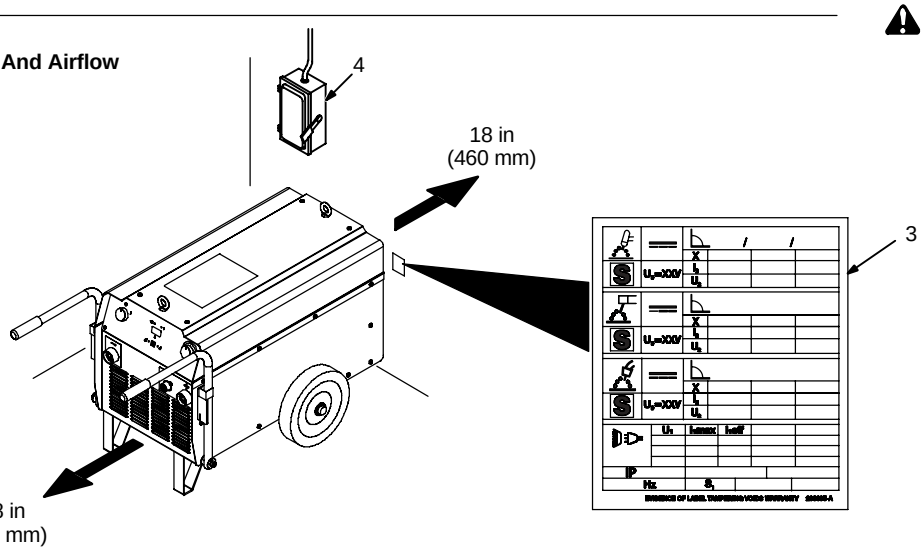
3-4. Selecting A Location



Movement



Location And Airflow



1 Lifting Eye

2 Lifting Forks

Use lifting eye or lifting forks to move unit.

If using lifting forks, extend forks beyond opposite side of unit.

3 Rating Label (Typical)

Use rating label to determine input power needs.

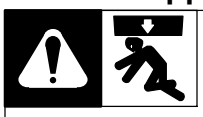
4 Line Disconnect Device

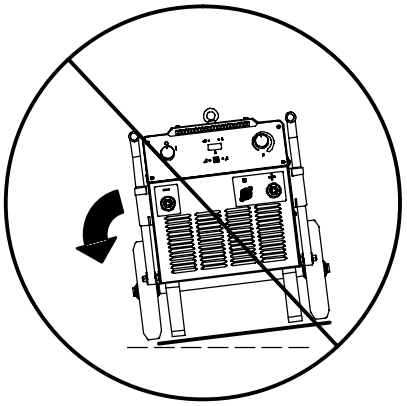
Locate unit near correct input power supply.

Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.

805 089 / 139 445-E

3-5. Tipping





Do not move or operate unit where it could tip.

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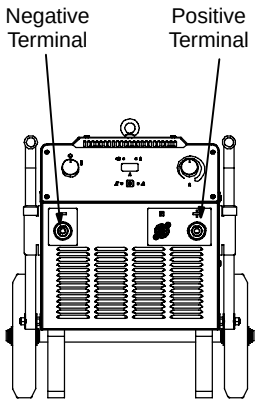
3-6. Weld Output Terminals and Selecting Cable Sizes

Weld Output Terminals

Turn off power before connecting to weld output terminals.

Do not use worn, damaged, undersized, or poorly spliced cables.



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Welding Amperes	Total Cable (Copper) Length In Weld Circuit Not Exceeding							
	100 ft (30 m) Or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)
	10 − 60% Duty Cycle	60 − 100% Duty Cycle	10 − 100% Duty Cycle					
100	20	20	20	25	35	50	50	50
150	25	25	35	50	50	70	90	90
200	25	35	50	50	70	90	90	90
250	35	35	50	70	90	90	120	120
300	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)
350	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)
400	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	2 ea. 4/0 (2x120)
500	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 3/0 (3x95)	3 ea. 3/0 (3x95)
600	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)	3 ea. 3/0 (3x95)	3 ea. 4/0 (3x120)	3 ea. 4/0 (3x120)

* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

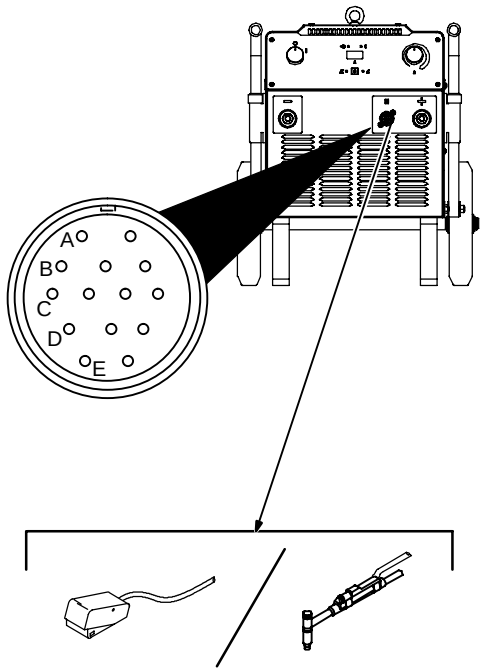
**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
( ) = mm^2 for metric use

S-0007-F−

***For distances longer than those shown in this guide, call a factory applications representative at 920-735-4505.

3-7. Remote Receptacle Information

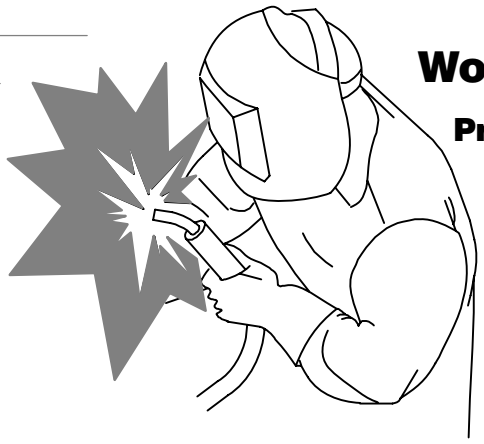
☞ *This unit automatically uses the remote control if connected to the remote receptacle.*



REMOTE	Socket*	Socket Information
REMOTE CONTROL	A	Contact closure to B completes 24 volts ac contactor control circuit.
	B	Contact closure to A completes 24 volts ac contactor control circuit.
	C	Output to remote control; +10 volts dc.
	D	Remote control circuit common.
	E	0 to +10 volts dc input command signal from remote control.

* The remaining sockets are not used.

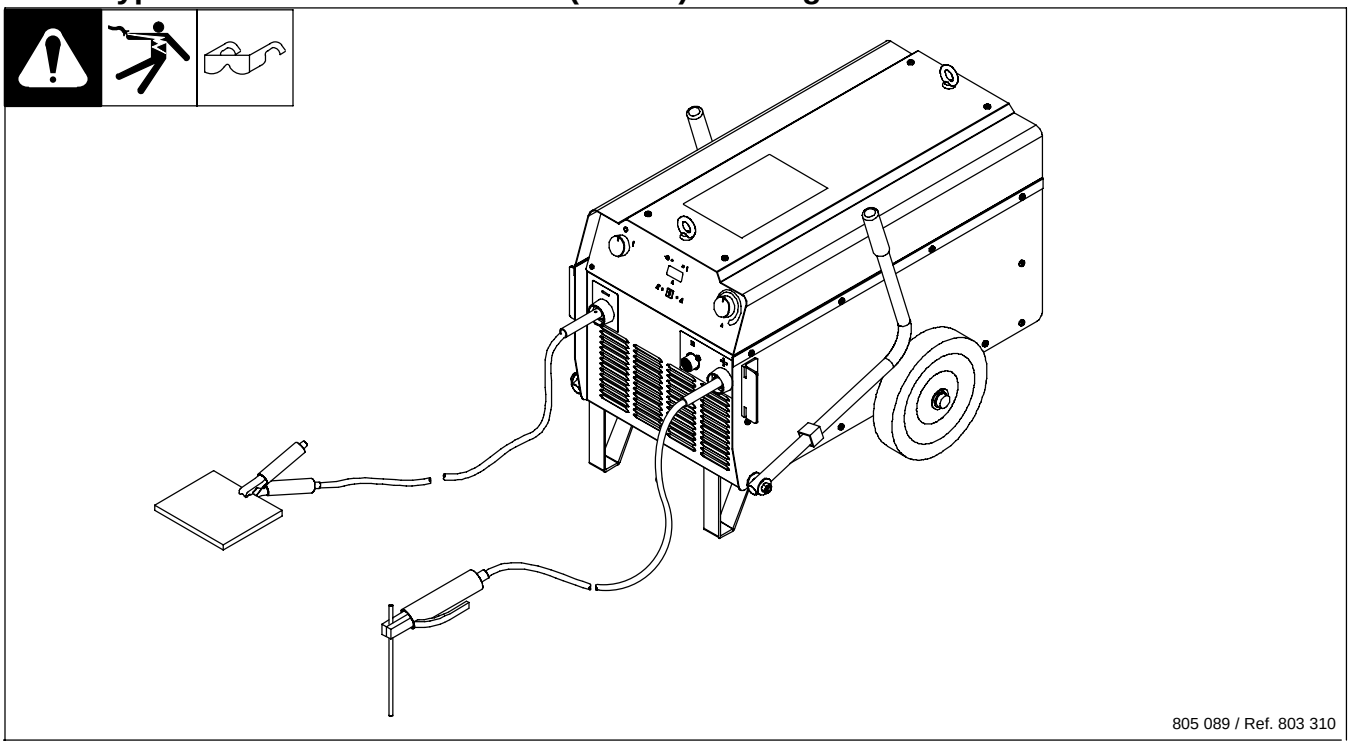
Notes



Work like a Pro!

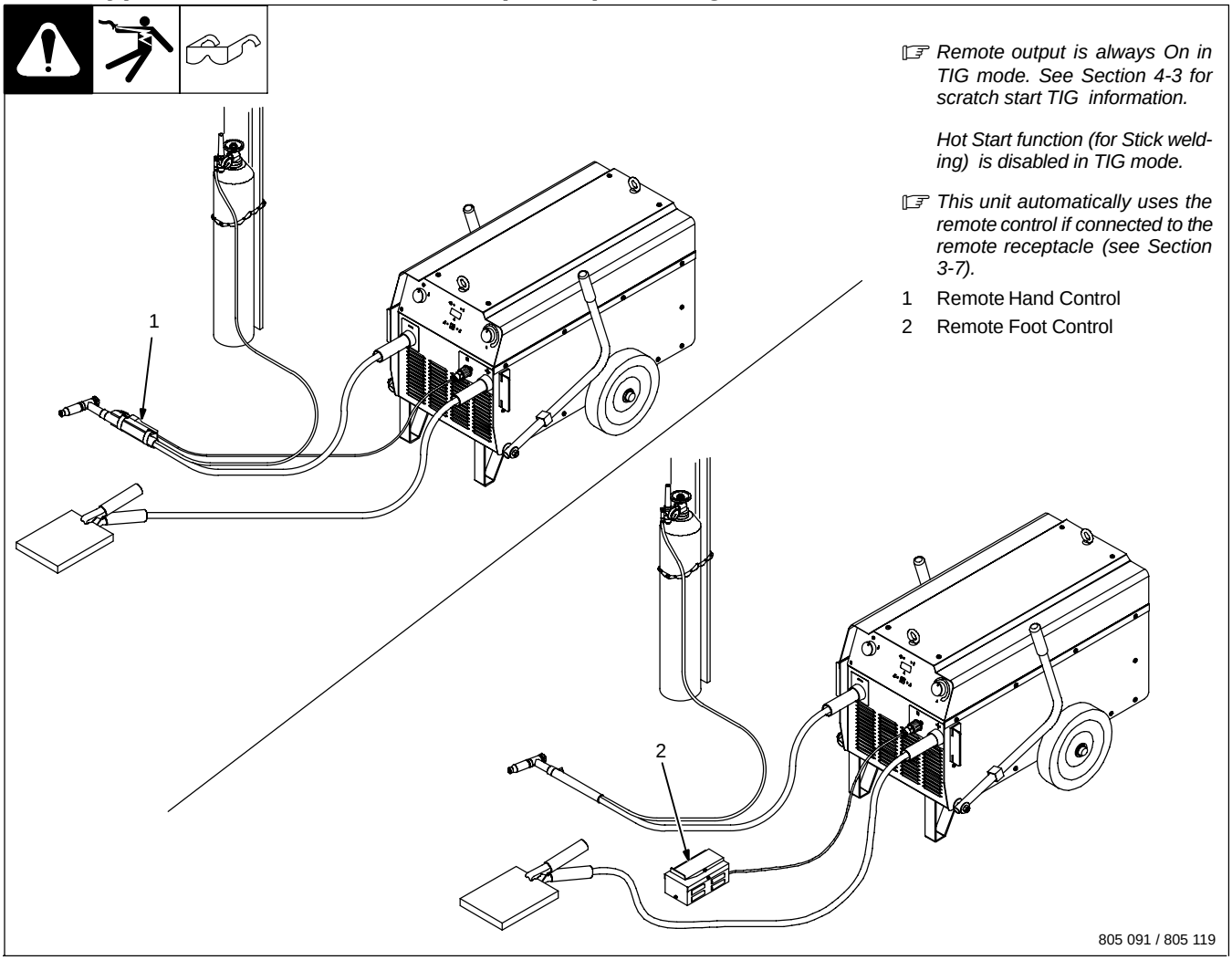
Pros weld and cut safely. Read the safety rules at the beginning of this manual.

3-8. Typical Connections For Stick (SMAW) Welding



805 089 / Ref. 803 310

3-9. Typical Connections For TIG (GTAW) Welding



☞ *Remote output is always On in TIG mode. See Section 4-3 for scratch start TIG information.*

Hot Start function (for Stick welding) is disabled in TIG mode.

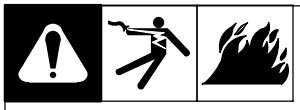
☞ *This unit automatically uses the remote control if connected to the remote receptacle (see Section 3-7).*

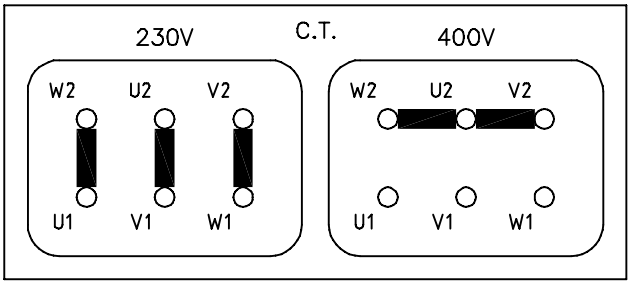
1 Remote Hand Control

2 Remote Foot Control

805 091 / 805 119

3-10. Positioning Jumper Links





Disconnect and lockout/tag-out input power before installing or moving jumper links.

Check input voltage available at site.

1 Jumper Links Access

Remove side panel.

2 Jumper Link Label

Check label − only one is on unit.

3 Input Voltage Jumper Links

Move jumper links to match input voltage.

Close and secure side panel.

Ref. S9215056

3-11. Electrical Service Guide

Failure to follow these fuse and circuit breaker recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit that applies to the rated output and duty cycle of the welding power source.

Input Voltage	230	400
Input Amperes At Rated Output	73	42
Max Recommended Standard Fuse Rating In Amperes [1]		
Time-Delay [2]	90	50
Normal Operating [3]	110	60
Min Input Conductor Size In AWG [4]	8	10
Max Recommended Input Conductor Length In Feet (Meters)	107 (33)	219 (67)
Min Grounding Conductor Size In AWG [4]	8	10
** Power cord supplied with the unit is sized for 230V operation. Larger power cord may be required for cable lengths greater than 3 meters. Consult national and local regulations.		

Reference: 2005 National Electrical Code (NEC) (including article 630)

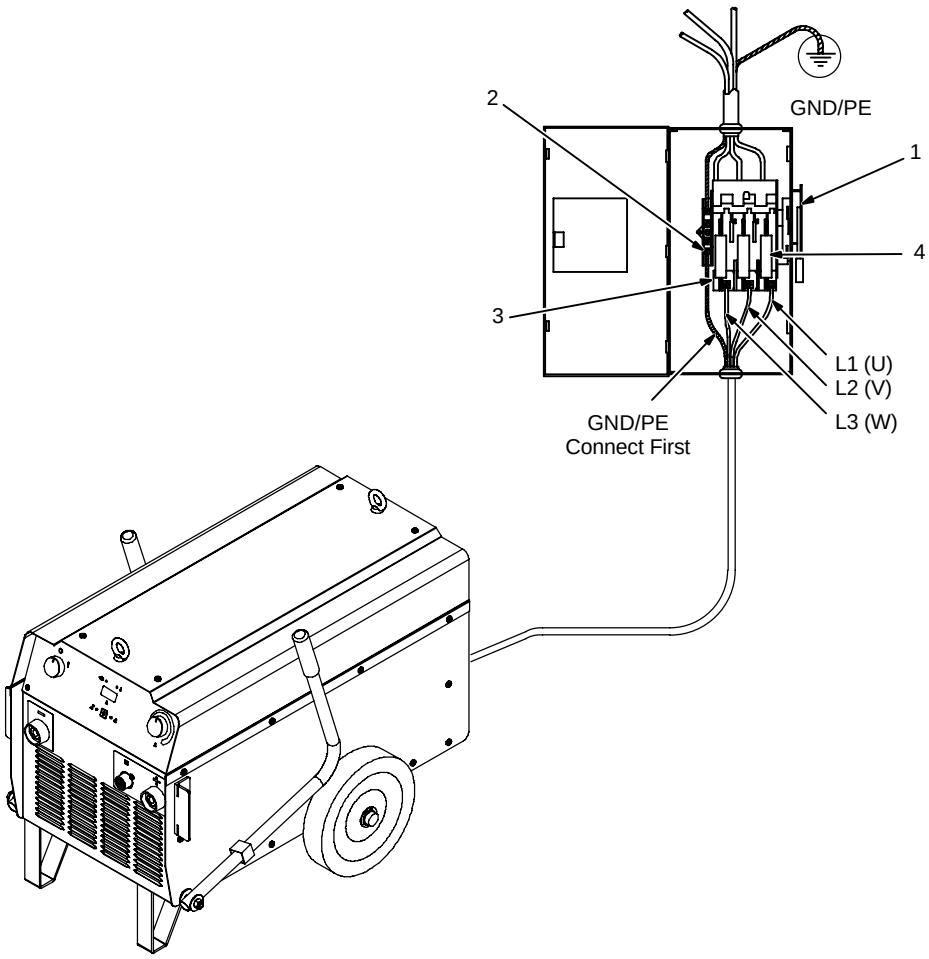
1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.

2 “Time-Delay” fuses are UL class “RK5” .

3 “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amp), and UL class “H” (65 amp and above).

4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

3-12. Connecting Input Power



⚠ Installation must meet all National and Local Codes − have only qualified persons make this installation.

⚠ Disconnect and lockout/tagout input power before connecting input conductors from unit.

⚠ Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

⚠ Make input power connections to the welding power source first.

⚠ Special installation may be required where gasoline or volatile liquids are present − see NEC Article 511 or CEC Section 20.

See rating label on unit and check input voltage available at site.

1 Disconnect Device (switch shown in OFF position)

2 Disconnect Device (Supply) Grounding Terminal

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

3 Disconnect Device Line Terminals

Connect input conductors L1 (U), L2 (V) And L3 (W) to disconnect device line terminals.

4 Overcurrent Protection

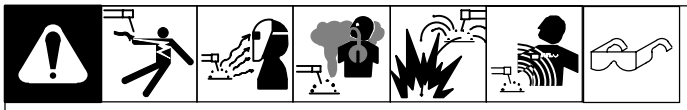
Select type and size of overcurrent protection using Section 3-11 (fused disconnect switch shown).

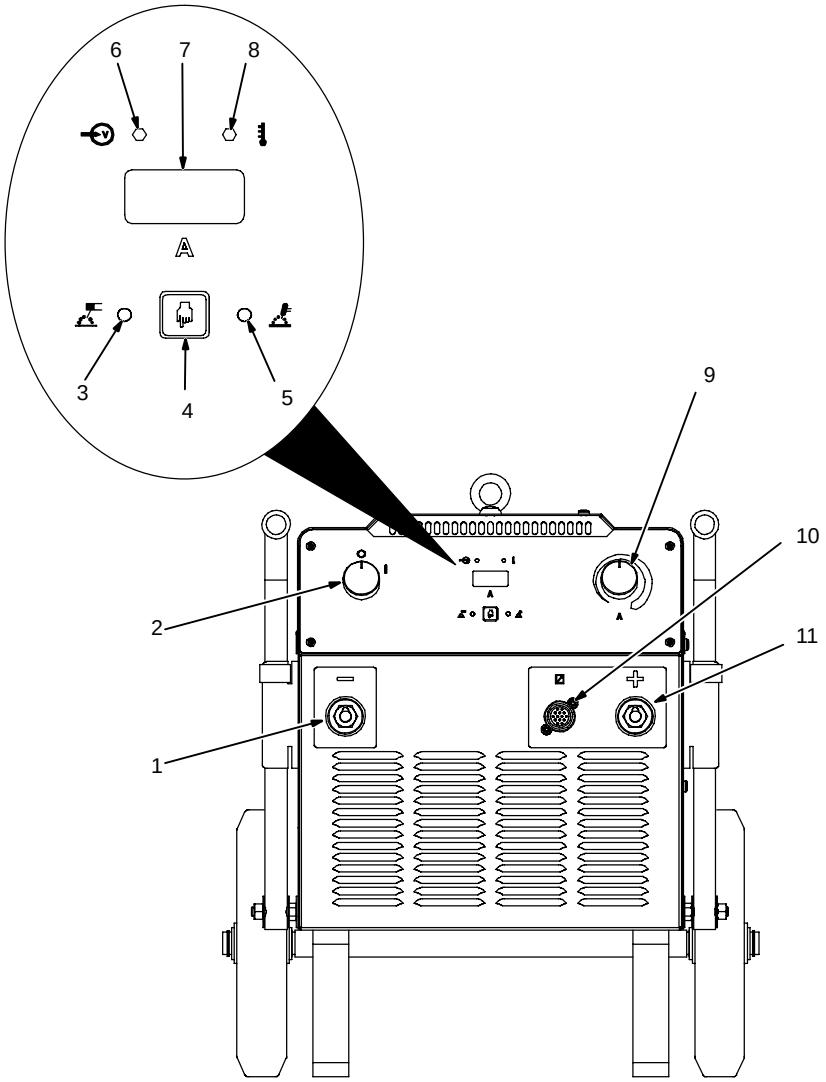
Close and secure door on line disconnect device. Remove lockout/tagout device, and place switch in the On position.

805 089 / 801 721

SECTION 4 − OPERATION

4-1. Controls





1 Negative (−) Weld Terminal
2 Power On-Off Switch
3 Stick (SMAW) Welding Indicator Light
4 Process Selection Switch

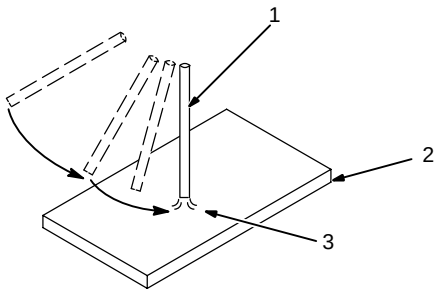
☞ *Remote output is always On in TIG mode.*

Hot Start function (for Stick welding) is disabled in TIG mode.

5 TIG (GTAW) Welding Indicator Light
6 Power On Pilot Light
7 Welding Current Indicator
8 High Temperature Indicator
9 Weld Current Control
10 Remote Control Receptacle (See Seection 3-7)
11 Positive (+) Weld Terminal

804 944

4-2. Stick Start Procedure − Scratch Start Technique



With Stick selected, start arc as follows:

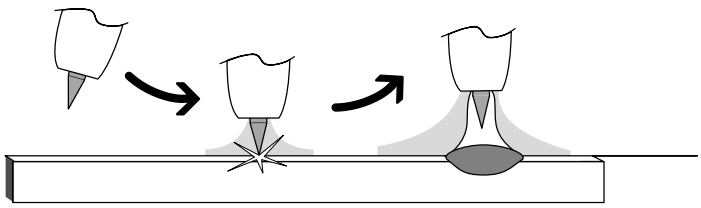
1 Electrode

2 Workpiece

3 Arc

Drag electrode across workpiece like striking a match; lift electrode slightly after touching work. If arc goes out electrode was lifted to high. If electrode sticks to workpiece, use a quick twist to free it.

4-3. Scratch Start TIG



This starting method is not acceptable for critical applications since small tungsten particles may become embedded in the workpiece and contaminate the weld.

Turn gas on.

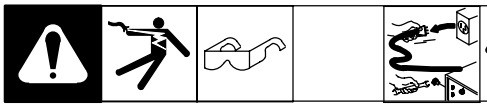
Quickly drag electrode across workpiece like striking a match; lift electrode slightly after touching work.

If arc goes out electrode was lifted to high. If electrode sticks to workpiece, use a quick twist to free it.

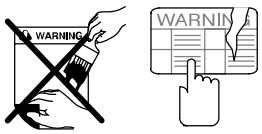
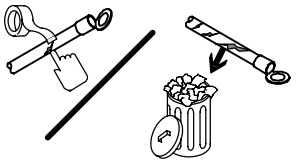
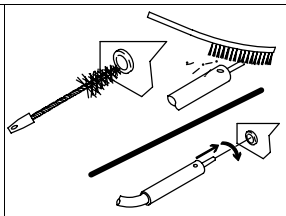
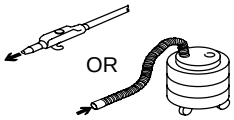
Ref. WM Marketing

SECTION 5 − MAINTENANCE AND TROUBLESHOOTING

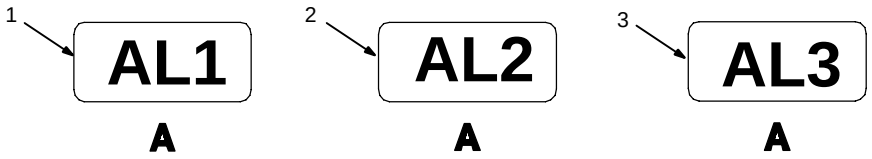
5-1. Routine Maintenance



Disconnect power before maintaining.

	✓ = Check ◇ = Change ◒ = Clean ☆ = Replace * To be done by Factory Authorized Service Agent			
Every **3** Months	 ☆ Damaged Or Unreadable Labels	 ☆ Cracked Weld cables	 ◒✓ Weld Connections	
Every **6** Months	 ◒ Inside Unit			

5-2. Help Displays

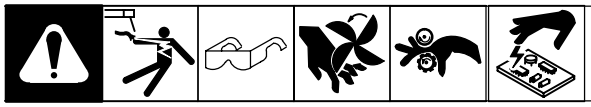


1 AL1 Display
2 AL2 Display
3 AL3 Display

☞ *Power On pilot light flashes when any of these help displays are shown.*

Displays indicate a malfunction in the primary power circuit (loss of input power phase). If any of these displays are shown, check input power connections. If trouble continues, contact a Factory Authorized Service Agent.

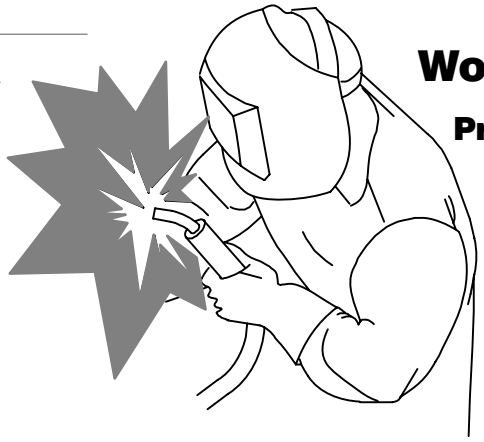
5-3. Troubleshooting



Trouble	Remedy
No weld output; fan does not run.	Be sure Power switch is On (see Section 4-1).
	Be sure line disconnect switch is in On position.
	Check and replace line fuses if open. Reset breakers if necessary.
Fan does not run; weld output okay.	Be sure nothing is blocking movement of fan. If fan does not run freely, replace fan motor.
Erratic or improper weld output.	Clean and tighten all weld cable connections.
	Check for proper size and type of cable (see Section 3-6).
	Check for proper input and output connections (see Sections 3-6 and/or 3-12).
	Replace electrode.

Trouble	Remedy
Erratic arc with excessive spatter.	Use dry, properly stored electrodes.
	Shorten arc length.
	Reduce amperage setting.
Electrode freezing to work.	Increase amperage setting.
	Increase arc length.
	Use dry, properly stored electrodes.
Low weld output with no control.	Check position of Amperage Control (see Section 4-1).
Limited output and low open-circuit voltage.	Check incoming power for correct voltage. Replace line fuse if open (see Section 3-12).
	Check for proper input and output connections (see Sections 3-6 and/or 3-12).

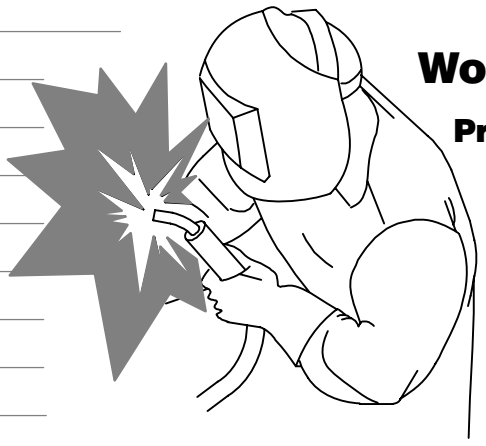
Notes



Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.

Notes

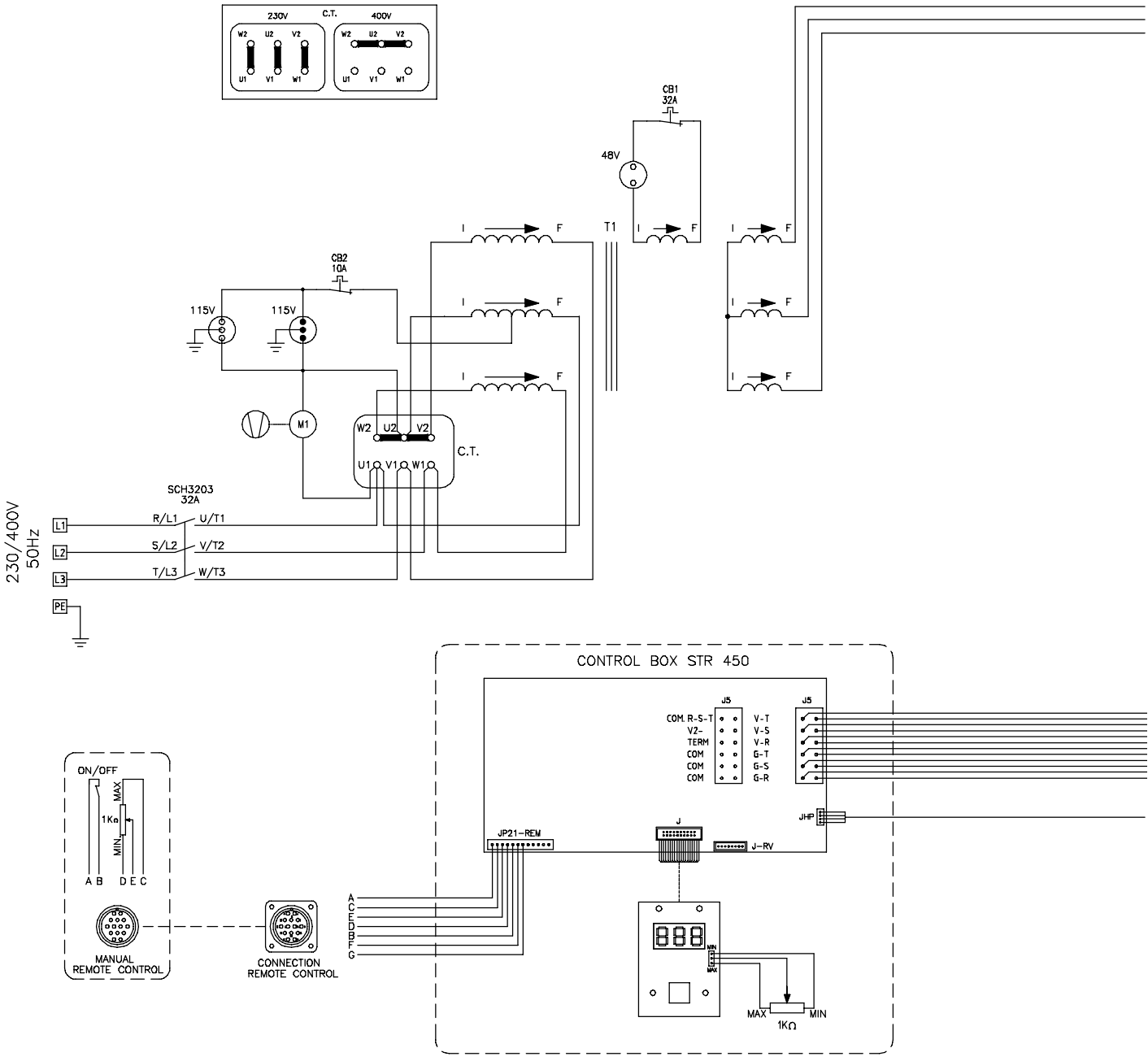


Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.

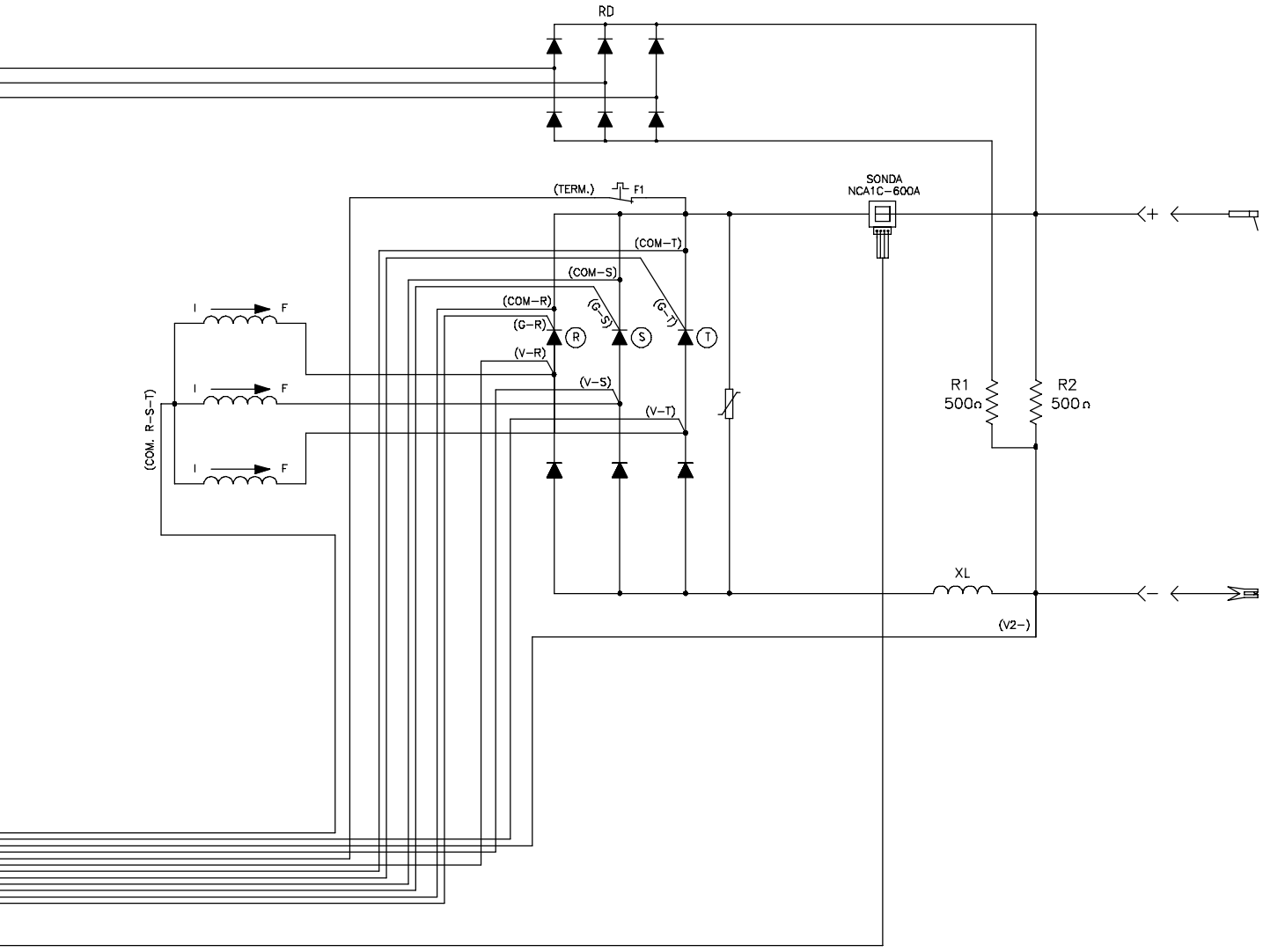
SECTION 6 − ELECTRICAL DIAGRAMS

⚠ WARNING	• Do not touch live electrical parts. • Disconnect input power or stop engine before servicing. • Do not operate with covers removed. • Have only qualified persons install, use, or service this unit.
ELECTRIC SHOCK HAZARD	



S9215056

Figure 6-1. Circuit Diagram For STR 450



S1	SWITCH	UMSCHALTER	COMMUTATEUR	CONMUTADOR	COMMUTATORE
M1	FAN	VENTILATOR	VENTILATEUR	VENTILADOR	VENTILATORE
F1	THERMOSTAT	THERMOSTAT	THERMOSTAT	TERMOSTATO	TERMOSTATO
RD	RECTIFIER	GLEICHRICHTER	REDRESSEUR	RECTIFICADOR	RADDRIZZATORE
R1-R2	RESISTANCE	RESISTANZ	RESISTANCE	RESISTANCIA	RESISTENZA
T1	TRANSFORMER	TRANSFORMATOR	TRANSFORMATEUR	TRANSFORMADOR	TRASFORMATORE
XL	CHOKE	IMPEDANZ	IMPEDANCE	IMPEDANCIA	IMPEDENZA
CB1	CIRCUIT BREAKER	SCHUTZSCHALTER	DISJORCTEUR	INTERRUPTOR AUTOMATICO	INTERRUTTORE TERMICO
CB2	CIRCUIT BREAKER	SCHUTZSCHALTER	DISJORCTEUR	INTERRUPTOR AUTOMATICO	INTERRUTTORE TERMICO

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SECTION 7 − PARTS LIST

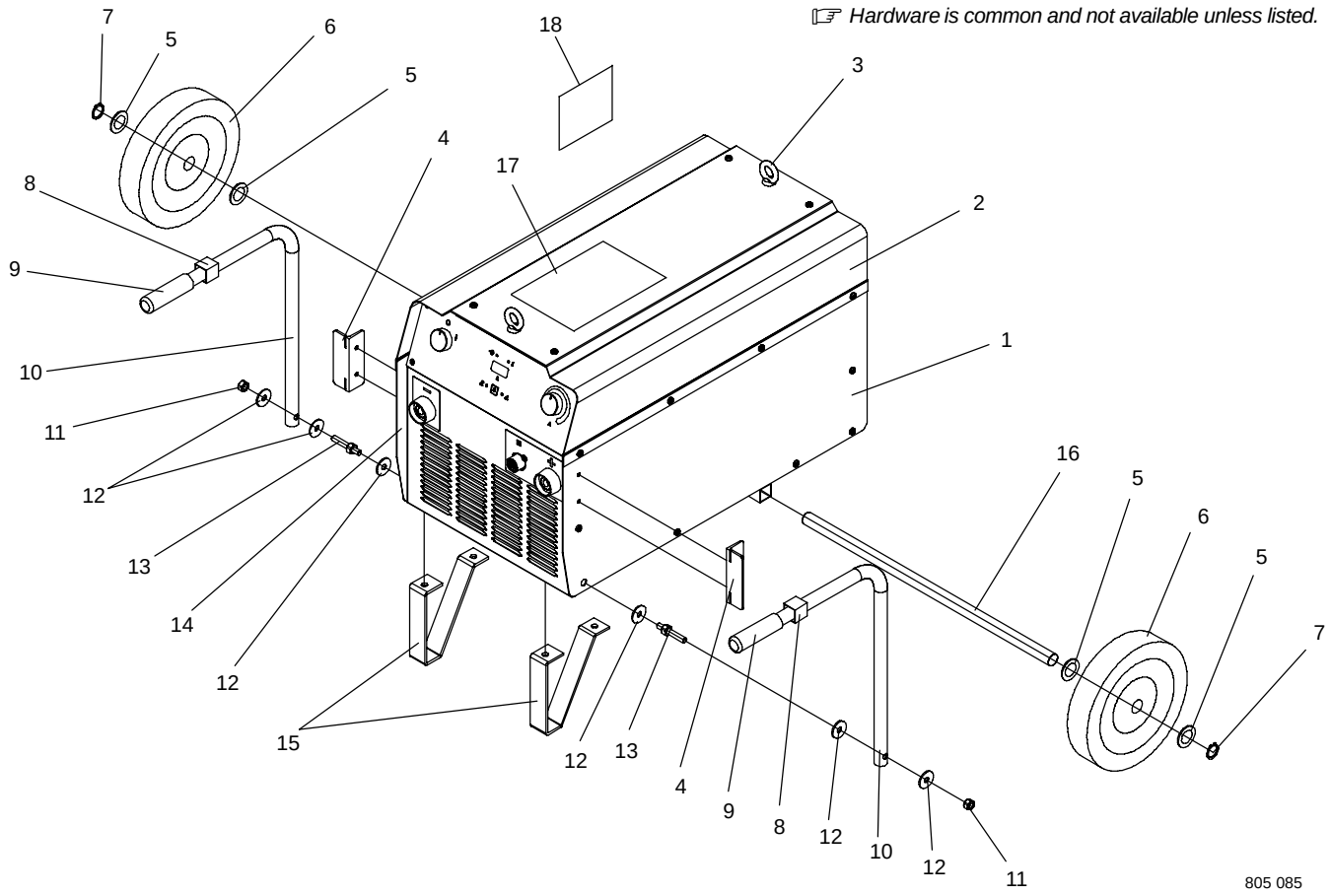

Figure 7-1. Case And Running Gear

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-1. Case And Running Gear

1		+156122078	Panel, right panel	1
2		+156121035	Upper panel	1
3		156011019	Lifting eye	2
4		156005129	Washer, Hooking (support for handle)	2
5		556009031	Washer, Brass .26 x 35 x 3 mm	4
6		056054057	Wheel d.300	2
7		156023156	Cup, Retaining Wheel	2
8		156009127	Washer, Round hooking (for handle)	2
9		056020071	Knob (for hose) 25 mm dia.	2
10		156002047	Handle	2
11		156018114	Nut, Locking	2
12		156009128	Washer, flat 1 0 x 30	6
13		156012132	Handle, fixing pin	2
14		+156122079	Panel, left side	1
15		156110001	Foot	2
16		156012133	Axle, Wheels 25 x 605 mm	1
17		176 254	Label, General Precautionary	1
18		207 291	Label, Warning Electric Shock Input 1 And 3 Phase CE	1

*Recommended Spare Parts.

\+ When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

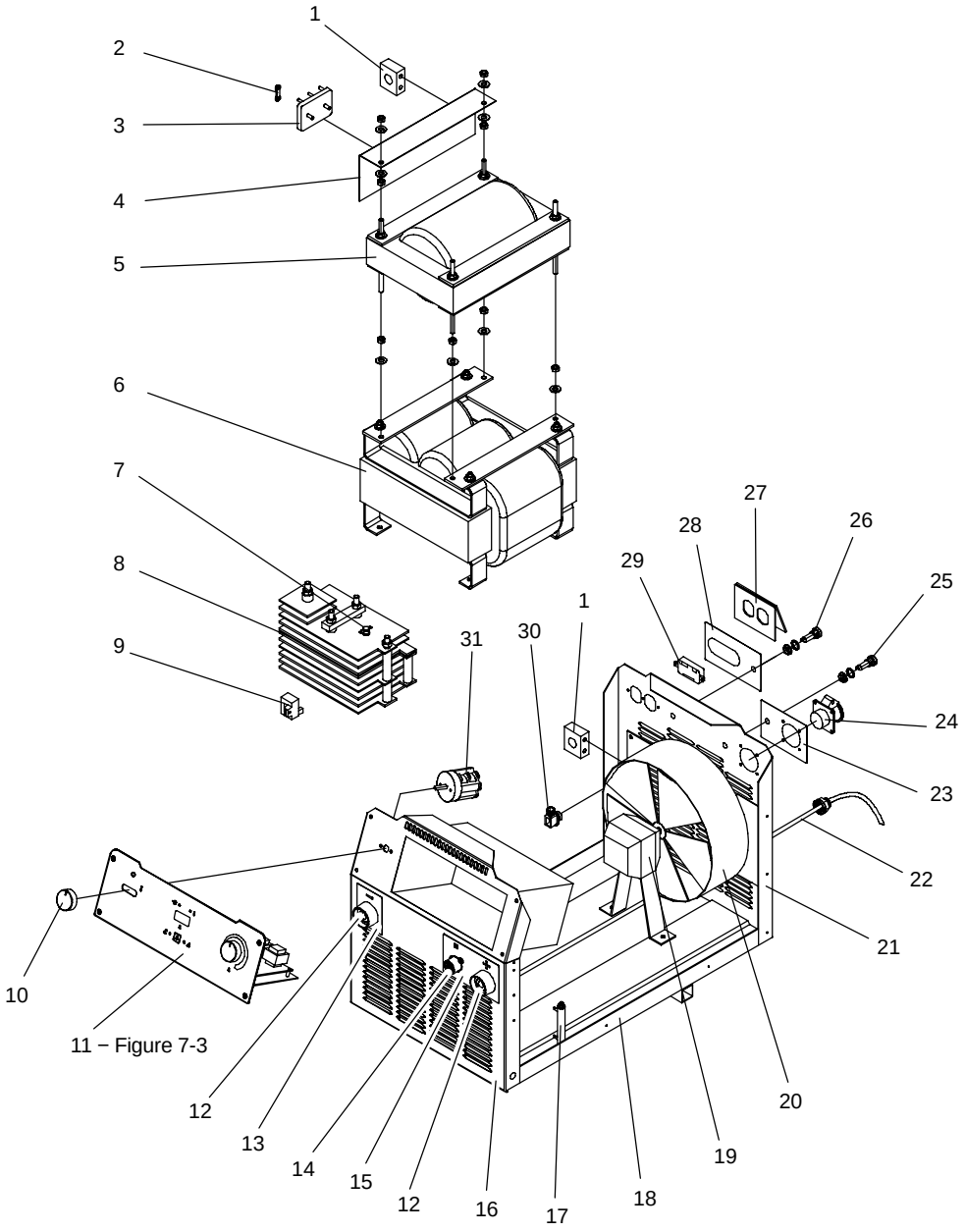

Figure 7-2. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-2. Main Assembly

1	656089037	Clamp, Cable	1
2	556070015	Link, Primary Terminal	9
3	756069030	Board, Primary Voltage Terminal	1
4	156005130	Support, Voltage Change Board	1
5	057098017	Choke	1
6	058021143	Transformer 230/400 V	1
7	056159026	Thermostat 100c 10 A	1
8	056050155	Rectifier	1
9	057028101	Probe	1
10	056020069	Knob, Pointer	1
11	058040013	Control Panel	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 7-2. Main Assembly (Continued)

12	056076152	Socket, Dinse 50 Sq Mm	2
13	956142592	Label, − (Negative) Welding Terminal	1
14	056076249	Connector, 14 Pin Female	1
15	956142608	Label, + (Positive) Welding Terminal	1
16	050001158	Front Panel + Pcb Box	1
17	056059281	Resistor, 500 Ohm	1
18	156006058	Base	1
19	057035009	Fan, 230 V	1
20	116117077	Conveyor	1
21	156118057	Panel, Rear	1
22	057014212	Cable, Primary Input 4 X10 Mt.4,5	1
23	956142610	Label, 48 V	1
24	056076212	Outlet, 32 A	1
25	056067263	Breaker, Circuit 32 A	1
26	056067264	Breaker, Circuit 10 A	1
27	000175282	Cover Receptacle Duplex	1
28	956142611	Label,115 V	1
29	000604176	Receptacle, 115v	1
30	656089026	Clamp, Cable	1
31	056067210	Switch, 32 A	1

*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

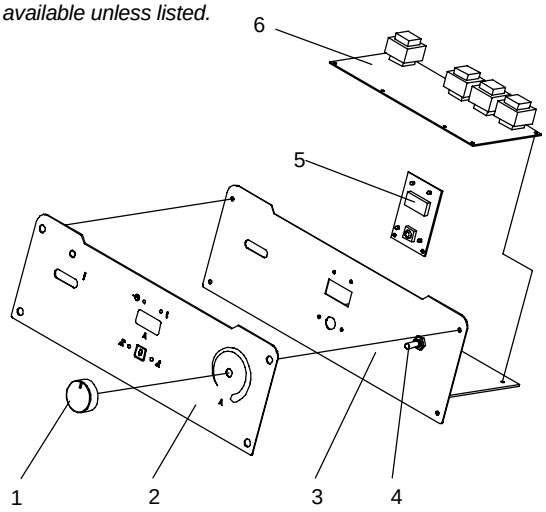

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Figure 7-3. Front Panel

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

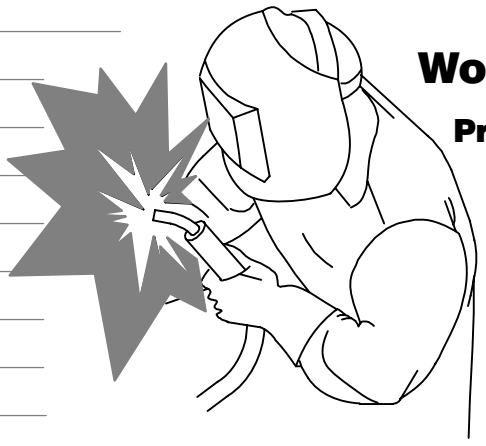
Figure 7-3. Front Panel

1	000207075	Knob, Pointer	1
2	756029012	Nameplate, Front	1
3	116145010	Plate	1
4	056059282	Potentiometer	1
5	057084132	PCB, Front Panel	1
6	057084133	PCB, Main	1

*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

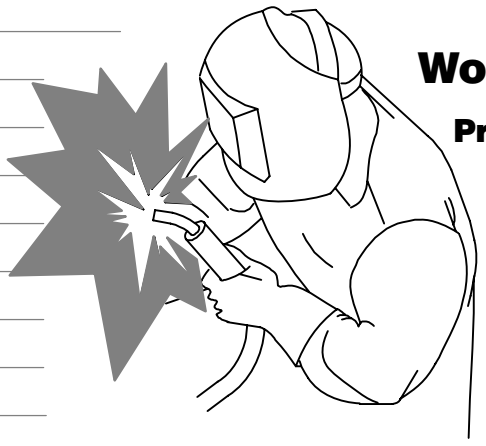
Notes



Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.

Notes



Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.

TRUE BLUE® WARRANTY

Effective January 1, 2009

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY − Subject to the terms and conditions below, ITW Welding Products Italy warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date the equipment was delivered to the original retail purchaser, not to exceed eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers limited to only include SCRs, diodes, and discrete rectifier components where applicable
   * Inverters (Input and Output Rectifiers Only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Sources (Unless Otherwise Stated)
   * Water Coolant Systems (Integrated)
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 2 Years — Parts and Labor
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * RFCS Foot Controls
   * IHPS Power Sources and Coolers
   * Water Coolant Systems (Non-Integrated)
   * HF Units
   * Running Gear/Trailers
   * Field Options (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 1 Year — Parts and Labor Unless Specified
   * DC 253 & 403 Rectifier (April 06>)
   * Migmatic 171 (April 06>)
5. 6 Months — Batteries
6. 90 Days — Parts
   * MIG Guns
   * Induction Heating Coils and Blankets
   * Remote Controls
   * Accessory (Kits)
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at ITW Welding Products Group Europe or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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Miller®

Owner’s Record

Please complete and retain with your personal records.

Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

Distributor

Address

Country Zip/Postal Code

For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:

- Welding Supplies and Consumables
- Options and Accessories
- Service and Repair
- Replacement Parts
- Owner’s Manuals

Contact the Delivering Carrier to:

File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer’s Transportation Department.

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Milanese, Italy
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